APPENDIX A: EQUIPMENT AND SUPPLY CHECKLISTS

APPENDIX A

EQUIPMENT AND SUPPLY CHECKLISTS

Field Data Forms and Sample Labels

Number per site	Item	
1	Verification Form	
1	Sample Collection Form and Stream Discharge Form	
11 + extras	Channel/Riparian Cross-section and Thalweg Profile Forms	
1	Slope and Bearing Form	
1	Legacy Tree/ Invasive Plant Form	
1	Channel Constraint and Field Measurement Form and Torrent Evidence Assessment Form	
2-3	Vertebrate Collection Form	
1	Rapid Habitat Assessment Form for Riffle/run prevalent streams (optional)	
1	Rapid Habitat Assessment Form for Pool/glide prevalent streams (optional)	
1	Assessment Form for visual stream assessment	
4 + extras	Sample Tracking Form	
3	Water chemistry labels (same ID number)	
3t	Periphyton labels (same ID number)	
1	Reachwide Benthic sample labels, with preprinted ID numbers	
1	Targeted Riffle Benthic sample labels with preprinted ID numbers	
1 sheet	Benthic labels for extra containers (no preprinted ID number)	
1 sheet	Blank benthic sample labels on waterproof paper for inside of jars	
1 sheet	Pre-printed aquatic vertebrate jar labels (4) and voucher bag tags (36), all with same preprinted sample ID number	
1 sheet	Fish tissue sample labels (up to 16 different sample ID number)	
2 copies	Field operations and methods manual	
2 sets	Laminated sheets of procedure tables and/or quick reference guides	

Office Supplies and Tools

Number per site	Item	
1	Dossier of access information for scheduled stream site	
1	Topographic map with “X-site” marked	
1	Site information sheet with map coordinates and elevation of X-site	
1	Sampling itinerary form or notebook	
1	Safety log and/or personal safety information for each team member	
4	Covered clipboards or forms holders	
1	Field notebook (optional)	
12	Soft (#2) lead pencils	
6	Fine-tip indelible markers	
1 roll	Duct tape	
1 pr	Scissors for cutting labels	
1	Pocket knife or multipurpose tool	
1	Battery charger (if needed for electrofishing unit)	
1	Toolbox with basic tools needed to maintain/repair sampling gear	
	Clear tape and covering labels	
	Binder clips for keeping forms together	

Personal Equipment and Supplies

Number per site	Item	
1 pair per person	Chest waders with felt-soled boots for safety and speed if waders are the neoprene "stocking" type. Hip waders can be used in shallower streams (except for electrofishing).	
1 per person	Life vests	
3 pair	Polarized sunglasses	
1	First aid kit	
1 per person	Rain gear	
1 or 2	Fisherman's vest for physical habitat characterization equipment.	
1 per person	Safety Whistles	
1 pr. per person	Earplugs (if gas-powered generators are used)	
1 per person	Day packs, backs, fanny packs, and/or dry bags for personal gear	
1 ea.	Insect repellent, sunscreen, Tec-nu (for poison oak), hand sanitizer, water purifier unit	
1	Patch kit for waders	

Chemicals

Number per site	Item	
1	Cooler (with suitable absorbent material) for transporting ethanol and samples	
2 gal	95% ethanol	
1 gal	Sparquat®disinfectant	

Packing and Shipping Supplies

Number per site	Item	
	Ice (also dry ice if it is used to ship frozen samples) or ice substitute packs	
1 box	1-gal heavy-duty self-sealing (e.g., with a zipper-type closure) plastic bags	
1-box	30-gal plastic garbage bags for lining shipping containers	
1 roll	Clear tape for sealing shipping containers	
2 pkg.	Clear tape strips for covering labels	
4 rolls	Plastic electrical tape	
3	Insulated shipping containers for samples	
2	Containers and absorbent material (e.g. vermiculite) suitable to transport and/or ship samples preserved in formalin or ethanol	
6	Shipping airbills and adhesive plastic sleeves	
1 box	2 gal. heavy duty plastic bags	

Site Verification and Sampling Reach Layout

Number per site	Item	
1	GPS receiver and operating manual	
	Extra batteries for GPS receiver	
1	Surveyor's telescoping leveling rod (round profile, metric scale, 7.5 m extended)	
1	50-m fiberglass measuring tape with reel	
2 rolls	Surveyor's flagging tape (2 colors)	
1	Waterproof camera and film (or digital camera)	

Water Chemistry

Number per site	Item	
1	Field thermometer	
1	500 mL plastic beaker with handle (in clean plastic bag)	
1	4-L cubitainer	
2	60 mL plastic syringes	
1	½ gal. size plastic container with snap-on lid to hold filled syringes	
2	Syringe valves	
1	Dissolved oxygen/Conductivity/Temperature meter with probe and operating manual (optional)	
1	DO repair kit with additional membranes and probe filling solution (optional)	
1	Conductivity meter, probe, and operating manual (if not integrated with DO/Temp meter (optional)	
	Extra batteries for dissolved oxygen and conductivity meters (optional)	
1	500-mL plastic bottle of conductivity QCCS labeled “Rinse” (in plastic bag) (optional)	
1	500-mL plastic bottle of conductivity QCCS labeled “Test” (in plastic bag) (optional)	
1	500-mL plastic bottle of deionized water to store conductivity probe (optional)	

Stream Discharge

Number per site	Item	
1	Current velocity meter and probe, with operating manual (e.g. Marsh-McBirney Model 201, Swoffer Model 2100, or equivalent)	
1	Top-set wading rod (metric scale) for use with current velocity meter	
1	Portable Weir with 60˚ “V” notch (optional)	
1	Plastic sheeting to use with weir (optional)	
1	Plastic bucket (or similar container) with volume graduations	
1	Stopwatch	
1	Neutrally buoyant object (e.g., orange, small rubber ball, stick, bobber)	

Physical Habitat

Number per site	Item	
1	Fisherman's vest with lots of pockets and snap fittings.	
1	50-m tape measure	
1	Clinometer with percent and degree scales.	
1	Lightweight telescoping camera tripod, (necessary only if slope measurements are being determined by only one person)	
1	½-inch diameter PVC pipe, 2-3 m long, each marked at the same height (for use in slope determinations involving two persons)	
1	Spherical convex canopy densiometer, modified with taped "V"	
1	Bearing compass (Backpacking type)	
1	Meter stick. Alternatively, a short (1-2 m) rod or pole (e.g., a ski pole) with cm markings for thalweg measurements	
1	Surveyors rod (optional)	

Benthic Macroinvertebrates

Number per site	Item	
1	D-Frame kick net (500 µm mesh) and 4-ft handle with cod piece	
	Spare net(s) for the kick net sampler or extra sampler	
1	Bucket, plastic, 8- to 10-qt capacity	
1	Sieve, U.S. Std. No. 35 (500 µm mesh), or Sieve bucket with 500-µm mesh openings	
2 pr. ea.	Watchmakers' and curved tip forceps	
1	Small spatula, spoon, or scoop to transfer sample	
1	Funnel, with large bore spout	
4 to 6 ea.	Sample jars, HDPE plastic with leakproof screw caps, 500-mL and 1-L capacity, suitable for use with ethanol	
1 pkg.	Kim wipes in small self-sealing plastic bag	
	gloves	

APPENDIX B: FIELD FORMS AND DATA SHEETS

FIELD SAMPLE SHIPMENT PACKING/TRACKING FORM

○ Wadeable ○ Boatable ○ Other = Fax Verification Form

Date Visited: ___ / ___ / 2 0 0 3

Check all that apply: ☐ Willamette Research Station ☐ Poison Depot ☐ Other

Site Name: (Write Unknown if unknown) ____________________

Visit Number 1 ☐ 2 ☐ 3 ☐

Airbill Number: ____________________

Contact: (Person calling in or faxing tracking info.) ____________________

Date Sent: ___ / ___ / 2 0 0 3

Site ID	Sample ID	Sample Type	# Of Jars	Fish:	Comments (Fish tissue species and other comments here.)
		○ Chem ○ Fish (Tissue) ○ Peri - BIO, CHLA, ID ○ Bent - Reachwide ○ Peri - Plankton Tow ○ Bent - Targeted Riffle ○ Peri - STAR ○ Vert (Vouchers)	☐	○ Big ○ Small	
		○ Chem ○ Fish (Tissue) ○ Peri - BIO, CHLA, ID ○ Bent - Reachwide ○ Peri - Plankton Tow ○ Bent - Targeted Riffle ○ Peri - STAR ○ Vert (Vouchers)	☐	○ Big ○ Small	
		○ Chem ○ Fish (Tissue) ○ Peri - BIO, CHLA, ID ○ Bent - Reachwide ○ Peri - Plankton Tow ○ Bent - Targeted Riffle ○ Peri - STAR ○ Vert (Vouchers)	☐	○ Big ○ Small	
		○ Chem ○ Fish (Tissue) ○ Peri - BIO, CHLA, ID ○ Bent - Reachwide ○ Peri - Plankton Tow ○ Bent - Targeted Riffle ○ Peri - STAR ○ Vert (Vouchers)	☐	○ Big ○ Small	
		○ Chem ○ Fish (Tissue) ○ Peri - BIO, CHLA, ID ○ Bent - Reachwide ○ Peri - Plankton Tow ○ Bent - Targeted Riffle ○ Peri - STAR ○ Vert (Vouchers)	☐	○ Big ○ Small	
		○ Chem ○ Fish (Tissue) ○ Peri - BIO, CHLA, ID ○ Bent - Reachwide ○ Peri - Plankton Tow ○ Bent - Targeted Riffle ○ Peri - STAR ○ Vert (Vouchers)	☐	○ Big ○ Small	
		○ Chem ○ Fish (Tissue) ○ Peri - BIO, CHLA, ID ○ Bent - Reachwide ○ Peri - Plankton Tow ○ Bent - Targeted Riffle ○ Peri - STAR ○ Vert (Vouchers)	☐	○ Big ○ Small	
		○ Chem ○ Fish (Tissue) ○ Peri - BIO, CHLA, ID ○ Bent - Reachwide ○ Peri - Plankton Tow ○ Bent - Targeted Riffle ○ Peri - STAR ○ Vert (Vouchers)	☐	○ Big ○ Small	
		○ Chem ○ Fish (Tissue) ○ Peri - BIO, CHLA, ID ○ Bent - Reachwide ○ Peri - Plankton Tow ○ Bent - Targeted Riffle ○ Peri - STAR ○ Vert (Vouchers)	☐	○ Big ○ Small	
		○ Chem ○ Fish (Tissue) ○ Peri - BIO, CHLA, ID ○ Bent - Reachwide ○ Peri - Plankton Tow ○ Bent - Targeted Riffle ○ Peri - STAR ○ Vert (Vouchers)	☐	○ Big ○ Small	
		○ Chem ○ Fish (Tissue) ○ Peri - BIO, CHLA, ID ○ Bent - Reachwide ○ Peri - Plankton Tow ○ Bent - Targeted Riffle ○ Peri - STAR ○ Vert (Vouchers)	☐	○ Big ○ Small	
		○ Chem ○ Fish (Tissue) ○ Peri - BIO, CHLA, ID ○ Bent - Reachwide ○ Peri - Plankton Tow ○ Bent - Targeted Riffle ○ Peri - STAR ○ Vert (Vouchers)	☐	○ Big ○ Small	
		○ Chem ○ Fish (Tissue) ○ Peri - BIO, CHLA, ID ○ Bent - Reachwide ○ Peri - Plankton Tow ○ Bent - Targeted Riffle ○ Peri - STAR ○ Vert (Vouchers)	☐	○ Big ○ Small	
		○ Chem ○ Fish (Tissue) ○ Peri - BIO, CHLA, ID ○ Bent - Reachwide ○ Peri - Plankton Tow ○ Bent - Targeted Riffle ○ Peri - STAR ○ Vert (Vouchers)	☐	○ Big ○ Small	
		○ Chem ○ Fish (Tissue) ○ Peri - BIO, CHLA, ID ○ Bent - Reachwide ○ Peri - Plankton Tow ○ Bent - Targeted Riffle ○ Peri - STAR ○ Vert (Vouchers)	☐	○ Big ○ Small	

Lab Contact: Richard Kovar (541)754-4735

Ph) (541)754-GOOD (4663) OR
Fax) (541)754-4338 ATTN: Marlys Cappaert

1) Name/Contact, Time of call, Site Name, Site ID and number, Collected date, Sent date, Visit number, Airbill number.
2) Site status from stream verification form ie: Wadeable, Boatable...
3) Information for both unpreserved samples as well as preserved samples, sent or not.

For office use only

Initials: ______ Status: ○

Date Entered: ___ / ___ / ___ Sample: ○

For Lab use only

Date Received: ___ / ___ / ___

Lab: Fax this sheet to 541-754-4338 Attn Marlys Cappaert

SAMPLE TYPES	
BENT =	Benthos
CHEM =	Water Chemistry
FISH =	Fish Tissue
PERI =	Periphyton
VERT =	Fish Museum

Box is for # of Jars Reachwide and Targeted Riffle. ☐

CONDITION CODES	
B	= Broken Syringe Tip
C	= Cracked Jar
F	= Frozen
L	= Leaking
ML	= Missing Label
NP	= Not Preserved
OK	= Seems Fine
T	= Thawed but still Cold
W	= Warm

63654

STREAM VERIFICATION FORM - STREAMS/RIVERS

Reviewed by (initial): _____

SITE NAME: _____ DATE: ___ / ___ / 2003 VISIT: 0 1 2 3

SITE ID: _____ Don't forget to record Reach Length on back. TEAM: _____

STREAM/RIVER VERIFICATION INFORMATION

Stream/River Verified by (X all that apply): ☐ GPS ☐ Local Contact ☐ Signs ☐ Roads ☐ Topo. Map

☐ Other (Describe Here): ☐ Not Verified (Explain in Comments)

Coordinates		Latitude North	Longitude West	Type of GPS Fix	Are GPS Coordinates w/i 10 Sec. of map?
MAP	Degrees, Minutes, and Seconds OR Decimal Degrees			☐ 2D ☐ 3D	☐ Yes ☐ No
GPS	Degrees, Minutes, and Seconds OR Decimal Degrees				

DID YOU SAMPLE THIS SITE?

☐ YES If YES, check one below

SAMPLEABLE (Choose method used)

- ☐ Wadeable - Continuous water, greater than 50% wadeable
- ☐ Boatable
- ☐ Partial - Sampled by wading (Explain in comments)
- ☐ Partial - Sampled by boat (Explain in comments)
- ☐ Wadeable Interrupted - Not continuous water along reach
- ☐ Boatable Interrupted - Not continuous water along reach
- ☐ Altered - Stream/River Present but not as on Map

☐ NO If NO, check one below

NON-SAMPLEABLE-PERMANENT

- ☐ Dry - Visited
- ☐ Dry - Not visited
- ☐ Wetland (No Definable Channel)
- ☐ Map Error - No evidence channel/waterbody ever present
- ☐ Impounded (Underneath Lake or Pond)
- ☐ Other (explain in comments)

NON-SAMPLEABLE-TEMPORARY

- ☐ Not boatable - Need a different crew
- ☐ Not wadeable - Need a different crew
- ☐ Other (Explain in comments)

NO ACCESS

- ☐ Access Permission Denied
- ☐ Permanently Inaccessible (Unable/Unsafe to Reach Site)
- ☐ Temporarily Inaccessible-Fire, etc. (Explain in comments)

GENERAL COMMENTS:

DIRECTIONS TO STREAM/RIVER SITE:

Record information used to define length of reach, and sketch general features of reach on reverse side.

56029

STREAM VERIFICATION FORM - STREAMS/RIVERS (cont.)

Reviewed by (initial): _____

SITE NAME: _____ DATE: ____ / ____ / 2003 VISIT: 0 1 2 3

SITE ID: _____ TEAM: _____

STREAM/RIVER REACH DETERMINATION

Channel Width Used to Define Reach (m)	DISTANCE (m) FROM X-SITE		DETERMINATION	Comment
	Upstream Length	Downstream Length	Total Reach Length Intended (m)	

SKETCH MAP - Arrow Indicates North

PERSONNEL

NAME	DUTIES Biomorph	Geomorph	Forms
_____	☐	☐	☐
_____	☐	☐	☐
_____	☐	☐	☐
_____	☐	☐	☐
_____	☐	☐	☐

PHab: CHANNEL/RIPARIAN CROSS-SECTION FORM - STREAMS

Reviewed by (Initials): _____

SITE ID: _____ DATE: ___ / ___ / 2003 TRANSECT: ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F X-tra Side Channel ☐
☐ G ☐ H ☐ I ☐ J ☐ K

SUBSTRATE CROSS-SECTIONAL INFORMATION

	Dist LB XX.XX m	Depth XXX cm	Size Class Code	Embed. 0-100%	Flag
Left					
LCtr					
Ctr					
RCtr					
Right					

SUBSTRATE SIZE CLASS CODES	Embed. (%)
RS = Bedrock (Smooth) - (Larger than a car)	0
RR = Bedrock (Rough) - (Larger than a car)	0
RC = Concrete/Asphalt	
XB = Large Boulder (1000 to 4000 mm) - (Meterstick to car)	
SB = Small Boulder (250 to 1000 mm) - (Basketball to meterstick)	
CB = Cobble (64 to 250 mm) - (Tennis ball to Basketball)	
GC = Coarse Gravel (16 to 64 mm) - (Marble to Tennis ball)	
GF = Fine Gravel (2 to 16 mm) - (Ladybug to marble)	
SA = Sand (0.06 to 2 mm) - (Gritty - up to Ladybug size)	100
FN = Silt / Clay / Muck - (Not Gritty)	100
HP = Hardpan - (Firm, Consolidated Fine Substrate)	0
WD = Wood - (Any Size)	
OT = Other (Write comment below)	

FISH COVER/ OTHER

0 = Absent (0%)
1 = Sparse (<10%)
2 = Moderate (10-40%)
3 = Heavy (40-75%)
4 = Very Heavy (>75%)
(circle one)

	Cover in Channel	Flag
Filamentous Algae	0 1 2 3 4	
Macrophytes	0 1 2 3 4	
Woody Debris >0.3 m (BIG)	0 1 2 3 4	
Brush/Woody Debris <0.3 m (SMALL)	0 1 2 3 4	
Live Trees or Roots	0 1 2 3 4	
Overhanging Veg. =<1 m of Surface	0 1 2 3 4	
Undercut Banks	0 1 2 3 4	
Boulders	0 1 2 3 4	
Artificial Structures	0 1 2 3 4	

VISUAL RIPARIAN ESTIMATES

0 = Absent (0%)
1 = Sparse (<10%)
2 = Moderate (10-40%)
3 = Heavy (40-75%)
4 = Very Heavy (>75%)

D = Deciduous
C = Coniferous
E = Broadleaf Evergreen
M = Mixed
N = None

RIPARIAN VEGETATION COVER	Left Bank	Right Bank	Flag
	Canopy (>5 m high)		
Vegetation Type	D C E M N	D C E M N	
BIG Trees (Trunk >0.3 m DBH)	0 1 2 3 4	0 1 2 3 4	
SMALL Trees (Trunk <0.3 m DBH)	0 1 2 3 4	0 1 2 3 4	
	Understory (0.5 to 5 m high)		
Vegetation Type	D C E M N	D C E M N	
Woody Shrubs & Saplings	0 1 2 3 4	0 1 2 3 4	
Non-Woody Herbs, Grasses, & Forbs	0 1 2 3 4	0 1 2 3 4	
	Ground Cover (<0.5 m high)		
Woody Shrubs & Saplings	0 1 2 3 4	0 1 2 3 4	
Non-Woody Herbs, Grasses and Forbs	0 1 2 3 4	0 1 2 3 4	
Barren, Bare Dirt or Duff	0 1 2 3 4	0 1 2 3 4	

HUMAN INFLUENCE	0 = Not Present P = >10 m C = Within 10 m B = On Bank		
	Left Bank	Right Bank	Flag
Wall/Dike/Revetment /Riprap/Dam	0 P C B	0 P C B	
Buildings	0 P C B	0 P C B	
Pavement/Cleared Lot	0 P C B	0 P C B	
Road/Railroad	0 P C B	0 P C B	
Pipes (Inlet/Outlet)	0 P C B	0 P C B	
Landfill/Trash	0 P C B	0 P C B	
Park/Lawn	0 P C B	0 P C B	
Row Crops	0 P C B	0 P C B	
Pasture/Range/Hay Field	0 P C B	0 P C B	
Logging Operations	0 P C B	0 P C B	
Mining Activity	0 P C B	0 P C B	

BANK MEASUREMENTS

	Bank Angle 0 - 360	Undercut Dist. (m)	Flag
Left			
Right			
Wetted Width XXX.X m			
Bar Width XX.X m			
Bankfull Width XXX.X m			
Bankfull Height XX.X m			
Incised Height XX.X m			

CANOPY COVER MEASUREMENTS

DENSIOMETER (0-17Max)

		Flag			Flag
CenUp			CenR		
CenL			Left		
CenDwn			Right		

Flag codes: K = Sample not collected; U = Suspect sample; F1, F2, etc. = misc. flag assigned by field crew. Explain all flags in comment sections.

Flag	Comments

27657

PHAB: THALWEG PROFILE & WOODY DEBRIS FORM STREAMS

Reviewed by (initial):_____

SITE ID: _____ DATE: ___ / ___ / 2003 TRANSECT: ☐ A-B ☐ B-C ☐ C-D ☐ D-E ☐ E-F ☐ F-G ☐ G-H ☐ H-I ☐ I-J ☐ J-K

THALWEG PROFILE

For Transect A-B ONLY: Increment (m) X.X: _____ Total Reach Length (m): _____

STATION	THALWEG DEPTH (cm) (XXX)	WETTED WIDTH (m) (XXX.X)	BAR WIDTH [1] Present	BAR WIDTH [1] XX.X	SOFT /SMALL SEDIMENT	CHANNEL UNIT CODE	POOL FORM CODE	SIDE CHANNEL	BACK WATER	FLAG	COMMENTS
0			Y N		Y N			Y N	Y N		
1			Y N		Y N			Y N	Y N		
2			Y N		Y N			Y N	Y N		
3			Y N		Y N			Y N	Y N		
4			Y N		Y N			Y N	Y N		
*5			Y N		Y N			Y N	Y N		
6			Y N		Y N			Y N	Y N		
*7			Y N		Y N			Y N	Y N		
8			Y N		Y N			Y N	Y N		
9			Y N		Y N			Y N	Y N		
10			Y N		Y N			Y N	Y N		
11			Y N		Y N			Y N	Y N		
12			Y N		Y N			Y N	Y N		
13			Y N		Y N			Y N	Y N		
14			Y N		Y N			Y N	Y N		

SUBSTRATE

Station (5 or 7)	LFT	LCTR	CTR	RCTR	RGT	FLAG
*						

FLAG	COMMENTS (for SUBSTRATE and LWD)

LARGE WOODY DEBRIS

(≥10 cm small end diameter; ≥ 1.5 m length)

CHECK IF UNMARKED BOXES ARE ZERO ☐ FLAG _____

DIAMETER LARGE END	PIECES ALL/PART IN BANKFULL CHANNEL			PIECES BRIDGE ABOVE BANKFULL CHANNEL		
	Length 1.5-5m	5-15m	>15m	Length 1.5-5m	5-15m	>15m
0.1-<0.3 m	☐	☐	☐	☐	☐	☐
0.3-0.6 m	☐	☐	☐	☐	☐	☐
0.6-0.8 m	☐	☐	☐	☐	☐	☐
>0.8 m	☐	☐	☐	☐	☐	☐

SUBSTRATE SIZE CLASS CODES	POOL FORM CODES	CHANNEL UNIT CODES
RS = BEDROCK (SMOOTH) - (LARGER THAN A CAR)	N = Not a pool	PP = Pool, Plunge
RR = BEDROCK (ROUGH) - (LARGER THAN A CAR)	W = Large Woody Debris	PT = Pool, Trench
RC = CONCRETE/ASPHALT	R = Rootwad	PL = Pool, Lateral Scour
XB = LG. BOULDER (1000 TO 4000 mm) - METERSTICK TO CAR)	B = Boulder or Bedrock	PB = Pool, Backwater
SB = SM. BOULDER (250 TO 1000 mm) - BASKETBALL TO METERSTICK)	F = Unknown, fluvial	PD = Pool, Impoundment
CB = COBBLE (64 TO 250 mm) - (TENNIS BALL TO BASKETBALL)		GL = Glide
GC = COARSE GRAVEL (16 TO 64 mm) - (MARBLE TO TENNIS BALL)	COMBINATIONS: eg. WR, BR, WRB	RI = Riffle
GF = FINE GRAVEL (2 TO 16 mm) - (LADYBUG TO MARBLE)		RA = Rapid
SA = SAND (0.06 TO 2 mm) - (GRITTY - UP TO LADYBUG SIZE)		CA = Cascade
FN = SILT/ CLAY / MUCK - (NOT GRITTY)		FA = Falls
HP = HARDPAN - (FIRM, CONSOLIDATED FINE SUBSTRATE)		DR = Dry Channel
WD = WOOD - (ANY SIZE)		
OT = OTHER (COMMENT ON OTHER SIDE)		

17021

Flag Codes: K = no measurement made; U = suspect measurement; F1, F2, ect. = flags assigned by each field crew; G1, G2, etc. for flags not specific to one station. Explain all flags in comments. 1 = Measure Bar Width at Station 0 and Mid-Station (5 or 7).

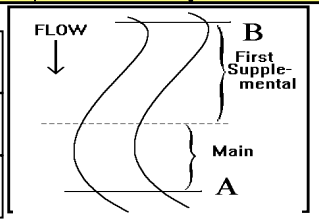
PHab: SLOPE AND BEARING FORM - STREAMS

Reviewed by (initial): _____

SITE ID: _____ DATE: ___ / ___ / 2003

TRANSECT & METHOD Mark method for every Transect	MAIN (always used) Slope(%) or Elev. Diff. (cm) Mark Units for every Transect	BEARING 0 - 359	PROPOR-TION %	FIRST SUPPLEMENTAL Slope(%) or Elev. Diff. (cm)	BEARING 0 - 359	PROPOR-TION %	SECOND SUPPLEMENTAL Slope(%) or Elev. Diff. (cm)	BEARING 0 - 359	PROPOR-TION %	FLAG
A < B ☐ CL ☐ TR ☐ HL ☐ WT ☐ LA ☐ Other	☐ % ☐ cm									
B < C ☐ CL ☐ TR ☐ HL ☐ WT ☐ LA ☐ Other	☐ % ☐ cm									
C < D ☐ CL ☐ TR ☐ HL ☐ WT ☐ LA ☐ Other	☐ % ☐ cm									
D < E ☐ CL ☐ TR ☐ HL ☐ WT ☐ LA ☐ Other	☐ % ☐ cm									
E < F ☐ CL ☐ TR ☐ HL ☐ WT ☐ LA ☐ Other	☐ % ☐ cm									
F < G ☐ CL ☐ TR ☐ HL ☐ WT ☐ LA ☐ Other	☐ % ☐ cm									
G < H ☐ CL ☐ TR ☐ HL ☐ WT ☐ LA ☐ Other	☐ % ☐ cm									
H < I ☐ CL ☐ TR ☐ HL ☐ WT ☐ LA ☐ Other	☐ % ☐ cm									
I < J ☐ CL ☐ TR ☐ HL ☐ WT ☐ LA ☐ Other	☐ % ☐ cm									
J < K ☐ CL ☐ TR ☐ HL ☐ WT ☐ LA ☐ Other	☐ % ☐ cm									

FLAG	COMMENT



53488

Flag codes: K = Sample not collected; U = Suspect sample; F1, F2, M (M = Method - used for method comment only) = flag assigned by field crew. Explain all flags in comment sections

 CL=Clinometer; HL=Hand Level; LA=Laser rangefinder with electronic clinometer; TR=Transit, surveyors level or total station; WT=Water Tubing.

RIPARIAN "LEGACY" TREES AND INVASIVE ALIEN PLANTS

Reviewed by (initial): _____

SITE ID: _____ DATE: ____ / ____ / 2003

22977

Tran	LARGEST POTENTIAL LEGACY TREE VISIBLE FROM THIS STATION						ALIEN PLANT SPECIES PRESENT IN LEFT AND RIGHT RIPARIAN PLOTS	
	Trees not Visible	DBH (m)	Height (m)	Dist. from wetted margin (m)	Type	Taxonomic Category	Check all that are present	
A	☐	☐ 0-0.1 ☐ .75-2 ☐ .1-.3 ☐ >2 ☐ .3-.75	☐ <5 ☐ 5-15 ☐ 15-30 ☐ >30	_____	☐ Deciduous ☐ Coniferous ☐ Broadleaf Evergreen	_____	☐ NONE	☐ RC Grass ☐ Salt Ced ☐ Hblack ☐ G Reed ☐ Engl Ivy ☐ CanThis ☐ Teasel ☐ C Burd ☐ Ch Grass ☐ M This ☐ Spurge ☐ Rus Ol
B	☐	☐ 0-0.1 ☐ .75-2 ☐ .1-.3 ☐ >2 ☐ .3-.75	☐ <5 ☐ 5-15 ☐ 15-30 ☐ >30	_____	☐ Deciduous ☐ Coniferous ☐ Broadleaf Evergreen	_____	☐ NONE	☐ RC Grass ☐ Salt Ced ☐ Hblack ☐ G Reed ☐ Engl Ivy ☐ CanThis ☐ Teasel ☐ C Burd ☐ Ch Grass ☐ M This ☐ Spurge ☐ Rus Ol
C	☐	☐ 0-0.1 ☐ .75-2 ☐ .1-.3 ☐ >2 ☐ .3-.75	☐ <5 ☐ 5-15 ☐ 15-30 ☐ >30	_____	☐ Deciduous ☐ Coniferous ☐ Broadleaf Evergreen	_____	☐ NONE	☐ RC Grass ☐ Salt Ced ☐ Hblack ☐ G Reed ☐ Engl Ivy ☐ CanThis ☐ Teasel ☐ C Burd ☐ Ch Grass ☐ M This ☐ Spurge ☐ Rus Ol

INSTRUCTIONS

Potential Legacy trees are defined as the largest tree within your search area, which is as far as you can see, but within maximum limits as follows:

Wadeable Streams: Confine search to no more than 50 m from left and right bank and extending upstream to next transect (for 'K' look upstream 4 channel widths)

Non-wadeable Rivers: Confine search to no more than 100 m from left and right bank and extending both upstream and downstream as far as you can see confidently.

Alien Plants: Confine search to riparian plots on left and right bank

Wadeable Streams: 10 m x 10 m

Non-wadeable Rivers: 10 m x 20 m

Not all aliens are to be identified in all states. See Field Manual and Plant Identification Guide.

TAXONOMIC CATEGORIES

Acacia/Mesquite
Alder/Birch
Ash
Maple/Boxelder
Oak
Poplar/Cottonwood
Sycamore
Willow
Unknown or Other Deciduous

Cedar/Cypress/Sequoia
Fir (including Douglas fir and hemlock)
Juniper
Pine
Spruce
Unknown or Other Conifer

Unknown or Other Broadleaf Evergreen

Snag (Dead tree of any species)

ALIEN SPECIES

RC Grass	Reed canarygrass	*Phalaris arundinacea*
Engl Ivy	English ivy	*Hedera helix*
ChGrass	Cheat grass	*Bromus tectorum*
Salt Ced	Salt Cedar	*Tamarix spp.*
Can This	Canada thistle	*Cirsium arvense*
M This	Musk thistle	*Carduus nutans*
Hblack	Himalayan blackberry	*Rubus discolor*
Teasel	Teasel	*Dipsacus fullonum*
Spurge	Leafy spurge	*Euphorbia esula*
G Reed	Giant reed	*Arundo donax*
C Burd	Common burdock	*Arctim minus*
Rus Ol	Russian-olive	*Elaeagnus angustifolia*

COMMENTS

Transects D to K continued on other side

RIPARIAN "LEGACY" TREES AND INVASIVE ALIEN PLANTS

Reviewed by (initial): _____

SITE ID: _____ DATE: ____ / ____ / 2003

22977

Tran	LARGEST POTENTIAL LEGACY TREE VISIBLE FROM THIS STATION						ALIEN PLANT SPECIES PRESENT IN LEFT AND RIGHT RIPARIAN PLOTS	
	Trees not Visible	DBH (m)	Height (m)	Dist. from wetted margin (m)	Type	Taxonomic Category	Check all that are present	
D	☐	☐ 0-0.1 ☐ .75-2 ☐ .1-.3 ☐ >2 ☐ .3-.75	☐ <5 ☐ 5-15 ☐ 15-30 ☐ >30	_____	☐ Deciduous ☐ Coniferous ☐ Broadleaf Evergreen	_____	☐ NONE	☐ RC Grass ☐ Salt Ced ☐ Hblack ☐ G Reed ☐ Engl Ivy ☐ CanThis ☐ Teasel ☐ C Burd ☐ Ch Grass ☐ M This ☐ Spurge ☐ Rus Ol
E	☐	☐ 0-0.1 ☐ .75-2 ☐ .1-.3 ☐ >2 ☐ .3-.75	☐ <5 ☐ 5-15 ☐ 15-30 ☐ >30	_____	☐ Deciduous ☐ Coniferous ☐ Broadleaf Evergreen	_____	☐ NONE	☐ RC Grass ☐ Salt Ced ☐ Hblack ☐ G Reed ☐ Engl Ivy ☐ CanThis ☐ Teasel ☐ C Burd ☐ Ch Grass ☐ M This ☐ Spurge ☐ Rus Ol
F	☐	☐ 0-0.1 ☐ .75-2 ☐ .1-.3 ☐ >2 ☐ .3-.75	☐ <5 ☐ 5-15 ☐ 15-30 ☐ >30	_____	☐ Deciduous ☐ Coniferous ☐ Broadleaf Evergreen	_____	☐ NONE	☐ RC Grass ☐ Salt Ced ☐ Hblack ☐ G Reed ☐ Engl Ivy ☐ CanThis ☐ Teasel ☐ C Burd ☐ Ch Grass ☐ M This ☐ Spurge ☐ Rus Ol
G	☐	☐ 0-0.1 ☐ .75-2 ☐ .1-.3 ☐ >2 ☐ .3-.75	☐ <5 ☐ 5-15 ☐ 15-30 ☐ >30	_____	☐ Deciduous ☐ Coniferous ☐ Broadleaf Evergreen	_____	☐ NONE	☐ RC Grass ☐ Salt Ced ☐ Hblack ☐ G Reed ☐ Engl Ivy ☐ CanThis ☐ Teasel ☐ C Burd ☐ Ch Grass ☐ M This ☐ Spurge ☐ Rus Ol
H	☐	☐ 0-0.1 ☐ .75-2 ☐ .1-.3 ☐ >2 ☐ .3-.75	☐ <5 ☐ 5-15 ☐ 15-30 ☐ >30	_____	☐ Deciduous ☐ Coniferous ☐ Broadleaf Evergreen	_____	☐ NONE	☐ RC Grass ☐ Salt Ced ☐ Hblack ☐ G Reed ☐ Engl Ivy ☐ CanThis ☐ Teasel ☐ C Burd ☐ Ch Grass ☐ M This ☐ Spurge ☐ Rus Ol
I	☐	☐ 0-0.1 ☐ .75-2 ☐ .1-.3 ☐ >2 ☐ .3-.75	☐ <5 ☐ 5-15 ☐ 15-30 ☐ >30	_____	☐ Deciduous ☐ Coniferous ☐ Broadleaf Evergreen	_____	☐ NONE	☐ RC Grass ☐ Salt Ced ☐ Hblack ☐ G Reed ☐ Engl Ivy ☐ CanThis ☐ Teasel ☐ C Burd ☐ Ch Grass ☐ M This ☐ Spurge ☐ Rus Ol
J	☐	☐ 0-0.1 ☐ .75-2 ☐ .1-.3 ☐ >2 ☐ .3-.75	☐ <5 ☐ 5-15 ☐ 15-30 ☐ >30	_____	☐ Deciduous ☐ Coniferous ☐ Broadleaf Evergreen	_____	☐ NONE	☐ RC Grass ☐ Salt Ced ☐ Hblack ☐ G Reed ☐ Engl Ivy ☐ CanThis ☐ Teasel ☐ C Burd ☐ Ch Grass ☐ M This ☐ Spurge ☐ Rus Ol
K	☐	☐ 0-0.1 ☐ .75-2 ☐ .1-.3 ☐ >2 ☐ .3-.75	☐ <5 ☐ 5-15 ☐ 15-30 ☐ >30	_____	☐ Deciduous ☐ Coniferous ☐ Broadleaf Evergreen	_____	☐ NONE	☐ RC Grass ☐ Salt Ced ☐ Hblack ☐ G Reed ☐ Engl Ivy ☐ CanThis ☐ Teasel ☐ C Burd ☐ Ch Grass ☐ M This ☐ Spurge ☐ Rus Ol

CHANNEL CONSTRAINT AND FIELD CHEMISTRY - STREAMS/RIVERS

Reviewed by (initial): _____

SITE ID: _____ DATE: ___ / ___ / 2003

IN SITU MEASUREMENTS

Station ID: (Assume X-site unless marked)

	Comments
STREAM/RIVER DO mg/l: (optional) ___.___	
STREAM RIVER TEMP. (°C): ___.___	
TIME OF DAY: ___:___	

CHANNEL CONSTRAINT

CHANNEL PATTERN (Check One)

- ☐ **One channel**
- ☐ **Anastomosing (complex) channel** - (Relatively long major and minor channels branching and rejoining.)
- ☐ **Braided channel** - (Multiple short channels branching and rejoining - mainly one channel broken up by numerous mid-channel bars.)

CHANNEL CONSTRAINT (Check One)

- ☐ **Channel very constrained in V-shaped valley** (i.e. it is very unlikely to spread out over valley or erode a new channel during flood)
- ☐ **Channel is in Broad Valley** but channel movement by erosion during floods is **constrained by Incision** (Flood flows do not commonly spread over valley floor or into multiple channels.)
- ☐ **Channel is in Narrow Valley but is not very constrained**, but limited in movement by relatively narrow valley floor (< ~10 x bankfull width)
- ☐ **Channel is Unconstrained in Broad Valley** (i.e. during flood it can fill off-channel areas and side channels, spread out over flood plain, or easily cut new channels by erosion)

CONSTRAINING FEATURES (Check One)

- ☐ **Bedrock** (i.e. channel is a bedrock-dominated gorge)
- ☐ **Hillslope** (i.e. channel constrained in narrow V-shaped valley)
- ☐ **Terrace** (i.e. channel is constrained by its own incision into river/stream gravel/soil deposits)
- ☐ **Human Bank Alterations** (i.e. constrained by rip-rap, landfill, dike, road, etc.)
- ☐ **No constraining features**

Percent of channel length with margin in contact with constraining feature: ___ % ---> (0-100%)

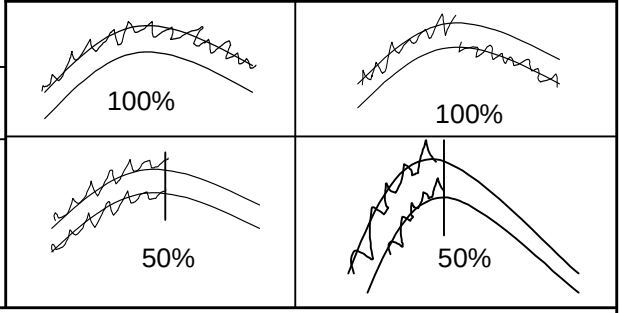
Bankfull width: ___ (m)

Valley width (Visual Estimated Average): ___ (m)

Note: Be sure to include distances between both sides of valley border for valley width.

If you cannot see the valley borders, record the distance you can see and mark this box. ☐

Percent of Channel Margin Examples



Comments

38480

Reviewed by (Initials): _____

TORRENT EVIDENCE ASSESSMENT FORM - STREAMS

SITE ID: _____ DATE: ___ / ___ / 2003

TORRENT EVIDENCE

Please X any of the following that are evident.

EVIDENCE OF TORRENT SCOURING:

☐	01 - Stream channel has a recently devegetated corridor two or more times the width of the low flow channel. This corridor lacks riparian vegetation with possible exception of fireweed, even-aged alder or cottonwood seedlings, grasses, or other herbaceous plants.
☐	02 - Stream substrate cobbles or large gravel particles are NOT IMBRICATED. (Imbricated means that they lie with flat sides horizontal and that they are stacked like roof shingles -- imagine the upstream direction as the top of the "roof.") In a torrent scour or deposition channel, the stones are laying in unorganized patterns, lying "every which way." In addition many of the substrate particles are angular (not "water-worn.")
☐	03 - Channel has little evidence of pool-riffle structure. (For example, could you ride a mountain bike down the channel?)
☐	04 - The stream channel is scoured down to bedrock for substantial portion of reach.
☐	05 - There are gravel or cobble berms (little levees) above bankfull level.
☐	06 - Downstream of the scoured reach (possibly several miles), there are massive deposits of sediment, logs, and other debris.
☐	07 - Riparian trees have fresh bark scars at many points along the stream at seemingly unbelievable heights above the channel bed.
☐	08 - Riparian trees have fallen into the channel as a result of scouring near their roots.

EVIDENCE OF TORRENT DEPOSITS:

☐	09 - There are massive deposits of sediment, logs, and other debris in the reach. They may contain wood and boulders that, in your judgement, could not have been moved by the stream at even extreme flood stage.
☐	10 - If the stream has begun to erode newly laid deposits, it is evident that these deposits are "MATRIX SUPPORTED." This means that the large particles, like boulders and cobbles, are often not touching each other, but have silt, sand, and other fine particles between them (their weight is supported by these fine particles -- in contrast to a normal stream deposit, where fines, if present, normally "fill-in" the interstices between coarser particles.)

NO EVIDENCE:

☐	11 - No evidence of torrent scouring or torrent deposits.

COMMENTS

SAMPLE COLLECTION FORM - STREAMS

Reviewed by (initial): _____

SITE ID: _____ DATE: ___ / ___ / 2003

WATER CHEMISTRY

Sample ID	Transect	Comments

REACH-WIDE BENTHOS SAMPLE

Sample ID	No. of Jars	Comment

TRANSECT		A		B		C		D		E		F		G		H		I		J		K	
SUBSTRATE	CHAN.	Sub.	Chan.	Sub.	Chan.	Sub.	Chan.	Sub.	Chan.	Sub.	Chan.	Sub.	Chan.	Sub.	Chan.	Sub.	Chan.	Sub.	Chan.	Sub.	Chan.	Sub.	Chan.
Fine/Sand	Pool	☐ F	☐ P	☐ F	☐ P	☐ F	☐ P	☐ F	☐ P	☐ F	☐ P	☐ F	☐ P	☐ F	☐ P	☐ F	☐ P	☐ F	☐ P	☐ F	☐ P	☐ F	☐ P
Gravel	Glide	☐ G	☐ GL	☐ G	☐ GL	☐ G	☐ GL	☐ G	☐ GL	☐ G	☐ GL	☐ G	☐ GL	☐ G	☐ GL	☐ G	☐ GL	☐ G	☐ GL	☐ G	☐ GL	☐ G	☐ GL
Coarse	Riffle	☐ C	☐ RI	☐ C	☐ RI	☐ C	☐ RI	☐ C	☐ RI	☐ C	☐ RI	☐ C	☐ RI	☐ C	☐ RI	☐ C	☐ RI	☐ C	☐ RI	☐ C	☐ RI	☐ C	☐ RI
Other: Note in Comments	Rapid	☐ O	☐ RA	☐ O	☐ RA	☐ O	☐ RA	☐ O	☐ RA	☐ O	☐ RA	☐ O	☐ RA	☐ O	☐ RA	☐ O	☐ RA	☐ O	☐ RA	☐ O	☐ RA	☐ O	☐ RA

TARGETED RIFFLE BENTHOS SAMPLE

Sample ID	No. of Jars	Comment

NEAREST TRANSECT								
Dom. Substrate								
Fine/Sand	☐ F/S	☐ F/S	☐ F/S	☐ F/S	☐ F/S	☐ F/S	☐ F/S	☐ F/S
Gravel	☐ G	☐ G	☐ G	☐ G	☐ G	☐ G	☐ G	☐ G
Coarse	☐ C	☐ C	☐ C	☐ C	☐ C	☐ C	☐ C	☐ C
Other: Note in Comments	☐ O	☐ O	☐ O	☐ O	☐ O	☐ O	☐ O	☐ O

SUBSTRATE SIZE CLASSES

F/S - ladybug or smaller (<2 mm)

G - ladybug to tennis ball (2 to 64 mm)

C - tennis ball to car sized (64 to 4000 mm)

O - bedrock, hardpan, wood, etc

Additional Benthos Comments

COMPOSITE PERIPHYTON SAMPLE

Sample ID	Composite Volume (mL)	Number of transects sampled (0-11):

Assemblage ID (50-mL tube, preserved)		Chlorophyll (GF/F filter)		Biomass (GF/F Filter)	
Sample Vol. (mL)	Flag	Sample Vol. (mL)	Flag	Sample Vol. (mL)	Flag

Flag	Comments

Flag codes: K = Sample not collected; U = Suspect sample; F1, F2, etc. = misc. flag assigned by field crew. Explain all flags in comment sections.

STREAM DISCHARGE FORM

Reviewed by (Initials): _____

SITE ID: _____ DATE: ___/___/2003

☐ Velocity Area

Distance Units	Depth Units	Velocity Units
☐ ft ☐ cm	☐ ft ☐ cm	☐ ft/s XX.X ☐ m/s X.XX

(Final measurement should be left bank.)

	Dist. from Bank	Depth	Velocity	Flag
1	0			
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

☐ Timed Filling

Repeat	Volume (L)	Time (s)	Flag
1	___.___	___.___	
2	___.___	___.___	
3	___.___	___.___	
4	___.___	___.___	
5	___.___	___.___	

☐ Neutral Bouyant Object

	Float 1	Float 2	Float 3
Float Dist. ☐ ft ☐ m			
Float Time (s)			
Flag			

Cross Sections on Float Reach

	Upper Section	Middle Section	Lower Section
Width ☐ ft ☐ m	___.___	___.___	___.___
Depth 1 ☐ ft ☐ cm			
Depth 2			
Depth 3			
Depth 4			
Depth 5			

☐ Q Value

If discharge is determined directly in field, record value here: Q = _____ ☐ cfs ☐ m^3/s FLAG ☐

Flag	Comments

Flag Codes: K = No measurement or observation made; U = Suspect measurement or observation; Q = Unacceptable QC check associated with measurement; Z = Last station measured (if not Station 20); F1, F2, etc. = Miscellaneous flags assigned by each field crew. Explain all flags in comments section.

STREAM ASSESSMENT FORM - STREAMS/RIVERS

Reviewed by (initial): _____

SITE ID: _____ DATE: ___ / ___ / 2003

WATERSHED ACTIVITIES AND DISTURBANCES OBSERVED (Intensity: Blank=Not observed, L=Low, M=Moderate, H=Heavy)

Residential	Recreational	Agricultural	Industrial	Stream Management
L M H Residences	L M H Hiking Trails	L M H Cropland	L M H Industrial Plants	L M H Liming
L M H Maintained Lawns	L M H Parks, Campgrounds	L M H Pasture	L M H Mines/Quarries	L M H Chemical Treatment
L M H Construction	L M H Primitive Parks, Camping	L M H Livestock Use	L M H Oil/Gas Wells	L M H Angling Pressure
L M H Pipes, Drains	L M H Trash/Litter	L M H Orchards	L M H Power Plants	L M H Dredging
L M H Dumping	L M H Surface Films	L M H Poultry	L M H Logging	L M H Channelization
L M H Roads		L M H Irrigation Equip.	L M H Evidence of Fire	L M H Water Level Fluctuations
L M H Bridge/Culverts		L M H Water Withdrawal	L M H Odors	L M H Fish Stocking
L M H Sewage Treatment			L M H Commercial	L M H Dams

SITE CHARACTERISTICS (200 m radius)

Waterbody Character

Pristine ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 Highly Disturbed

Appealing ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 Unappealing

Beaver

Beaver Signs: ☐ Absent ☐ Rare ☐ Common

Beaver Flow Modifications: ☐ None ☐ Minor ☐ Major

Dominant Land Use

Dominant Land Use Around 'X' ☐ Forest ☐ Agriculture ☐ Range ☐ Urban ☐ Suburban/Town

If Forest, Dominant Age Class ☐ 0 - 25 yrs. ☐ 25 - 75 yrs. ☐ > 75 yrs.

WEATHER

GENERAL ASSESSMENT (Biotic integrity, Vegetation diversity, Local anecdotal information)

STREAM ASSESSMENT FORM - STREAM/RIVERS (cont.)

Reviewed by (initial): _____

SITE ID: _____ DATE: ___ / ___ / 2003

GENERAL ASSESSMENT (continued)

Reviewed by (Initials): _____

RAPID HABITAT ASSESSMENT FORM: RIFFLE/RUN - STREAM

SITE ID: _____ DATE: ____ / ____ / 2003

HABITAT PARAMETER	CONDITION CATEGORY			
	OPTIMAL	SUB-OPTIMAL	MARGINAL	POOR
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential; (i.e., logs/snags that are NOT new fall and NOT transient.)	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintainance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is less than 0.3 m/s, deep is greater than 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increases in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material; increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills over 75% of the available channel; or less than 25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Reviewed by (Initials): _____

RAPID HABITAT ASSESSMENT FORM: RIFFLE/RUN (continued) - STREAM

SITE ID: _____ DATE: ____ / ____ / 2003

HABITAT PARAMETER	CONDITION CATEGORY			
	OPTIMAL	SUB-OPTIMAL	MARGINAL	POOR
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream greater than 7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by width of stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by width of stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by width of stream is a ratio of over 25.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) NOTE: Determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. Less than 5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Left Bank Score:	Left Bank: 10 9	8 7 6	5 4 3	2 1 0
Right Bank Score:	Right Bank: 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% if the streambank surfaces covered by native vegetation; but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruptions obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Left Bank Score:	Left Bank: 10 9	8 7 6	5 4 3	2 1 0
Right Bank Score:	Right Bank: 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank)	Width of riparian zone greater than 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted the zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone less than 6 meters; little or no riparian vegetation due to human activities.
Left Bank Score:	Left Bank: 10 9	8 7 6	5 4 3	2 1 0
Right Bank Score:	Right Bank: 10 9	8 7 6	5 4 3	2 1 0

Reviewed by (Initials): _____

RAPID HABITAT ASSESSMENT FORM: GLIDE/POOL - STREAMS

SITE ID: _____ DATE: ___ / ___ / 2003

HABITAT PARAMETER	CATEGORY			
	OPTIMAL	SUB-OPTIMAL	MARGINAL	POOR
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are NOT new fall and NOT transient.)	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallows.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or absent.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increases in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material; increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills over 75% of the available channel; or less than 25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Reviewed by (Initials): _____

RAPID HABITAT ASSESSMENT FORM: GLIDE/POOL (continued) - STREAMS

SITE ID: _____ DATE: ___ / ___ / 2003

HABITAT PARAMETER	CATEGORY			
	OPTIMAL	SUB-OPTIMAL	MARGINAL	POOR
7. Channel Sinuosity Score:	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note- channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.) 20 19 18 17 16	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line. 15 14 13 12 11	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line. 10 9 8 7 6	Channel straight; waterway has been channelized for a long distance. 5 4 3 2 1 0
8. Bank Stability (score each bank) NOTE: Determine left or right side by facing downstream. Left Bank Score:	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. Less than 5% of bank affected. Left Bank: 10 9	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion. 8 7 6	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods. 5 4 3	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars. 2 1 0
Right Bank Score:	Right Bank: 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) Left Bank Score:	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. Left Bank: 10 9	70-90% if the streambank surfaces covered by native vegetation; but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining. 8 7 6	50-70% of the streambank surfaces covered by vegetation; disruptions obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining. 5 4 3	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height. 2 1 0
Right Bank Score:	Right Bank: 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetation Zone Width (score each bank) Left Bank Score:	Width of riparian zone greater than 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted the zone. Left Bank: 10 9	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally. 8 7 6	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal. 5 4 3	Width of riparian zone less than 6 meters; little or no riparian vegetation due to human activities. 2 1 0
Right Bank Score:	Right Bank: 10 9	8 7 6	5 4 3	2 1 0